

November 28, 1986

DMB 016

Docket No. 50-317

DISTRIBUTION:

Docket File
NRC & LPDRs
BGrimes
WRegan
PBD#8 Rdg
WJones
PMKreutzer-3
SMcNeil
OGC-Bethesda
ACRS-10

NThompson
FMiraglia
EButcher
LFMB
Gray Files +4
OPA
TBarnhart-4
EJordan
JPartlow
LJHarmon

Mr. J. A. Tiernan
Vice President - Nuclear Energy
Baltimore Gas & Electric Company
P. O. Box 1475
Baltimore, Maryland 21203

Dear Mr. Tiernan:

The Commission has issued the enclosed Amendment No. 124 to Facility Operating License No. DPR-53 for Calvert Cliffs Nuclear Power Plant, Unit No. 1. This amendment consists of changes to the Technical Specifications in response to your application dated November 23, 1986. During this review process, LCO 3.8.1.2.a was modified to specify the 500 kV offsite circuit; Surveillance Requirement 4.8.1.2 was deleted for clarification as it was redundant with requirements 4.8.1.2.1 and 4.8.1.2.2; and LCOs 3.8.1.2 and 3.8.2.2 were made applicable to mode 6 only as requested in your November 23, 1986 submittal. All of these changes were discussed and made with the consent of your staff on November 26, 1986 through November 28, 1986.

This amendment completes the Commission action in response to the Baltimore Gas and Electric Company application of November 23, 1986.

The amendment temporarily changes Technical Specification (TS) 3/4.8.1, "A.C. Sources," and TS 3/4.8.2., "Onsite Power Distribution Systems," to permit for one time only, the movement of fuel or core alterations in Unit 1 without the services of an operable emergency diesel generator.

This temporary change shall expire 1) upon completion of licensee preparations to drain but before commencing the actual draining of the Unit 1 refueling pool below the 23 foot level, 2) upon restoration of EDG 12 to operability or 3) at 11:59 PM on December 10, 1986, whichever occurs earlier.

A copy of the related Safety Evaluation also is enclosed. The notice of issuance will be included in the Commission's next bi-weekly Federal Register notice.

Sincerely,

Original signed by

Scott Alexander McNeil, Project Manager
PWR Project Directorate #8
Division of PWR Licensing-B

8612080621 861128
PDR ADOCK 05000317
PDR

Enclosures:

- 1. Amendment No. 124 to DPR-53
- 2. Safety Evaluation

cc w/enclosures: See next page

PBD#7 IJLee RIngram 11/29/86 <i>Sam for Eas directed by</i>	PBD#8 SMcNeil;cf 11/28/86 <i>Sam</i>	OGC J. Scinto 11/28/86 <i>Sam for E as directed by</i>	PEICSB JCalvo 11/28/86 <i>Sam for E directed by</i>	PBD#8 ATHadani 11/28/86 <i>Sam for E directed by</i>
--	---	---	--	---

Mr. J. A. Tiernan
Baltimore Gas & Electric Company

Calvert Cliffs Nuclear Power Plant

cc:
Mr. William T. Bowen, President
Calvert County Board of
Commissioners
Prince Frederick, Maryland 20768

Regional Administrator, Region I
U.S. Nuclear Regulatory Commission
Office of Executive Director
for Operations
631 Park Avenue
King of Prussia, Pennsylvania 19406

D. A. Brune, Esq.
General Counsel
Baltimore Gas and Electric Company
P. O. Box 1475
Baltimore, Maryland 21203

Jay E. Silberg
Shaw, Pittman, Potts and Trowbridge
2300 N Street, N.W.
Washington, DC 20037

Mr. M. E. Bowman, General Supervisor
Technical Services Engineering
Calvert Cliffs Nuclear Power Plant
MD Rts 2 & 4, P. O. Box 1535
Lusby, Maryland 20657-0073

Resident Inspector
c/o U.S. Nuclear Regulatory Commission
P. O. Box 437
Lusby, Maryland 20657-0073

Bechtel Power Corporation
ATTN: Mr. D. E. Stewart
Calvert Cliffs Project Engineer
15740 Shady Grove Road
Gaithersburg, Maryland 20760

Combustion Engineering, Inc.
ATTN: Mr. W. R. Horlacher, III
Project Manager
P. O. Box 500
1000 Prospect Hill Road
Windsor, Connecticut 06095-0500

Department of Natural Resources
Energy Administration, Power Plant
Siting Program
ATTN: Mr. T. Magette
Tawes State Office Building
Annapolis, Maryland 21204



UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D. C. 20555

BALTIMORE GAS AND ELECTRIC COMPANY

DOCKET NO. 50-317

CALVERT CLIFFS NUCLEAR POWER PLANT UNIT NO. 1

AMENDMENT TO FACILITY OPERATING LICENSE

Amendment No. 124
License No. DPR-53

1. The Nuclear Regulatory Commission (the Commission) has found that:
 - A. The application for amendment by Baltimore Gas & Electric Company (the licensee) dated November 23, 1986, complies with the standards and requirements of the Atomic Energy Act of 1954, as amended (the Act), and the Commission's rules and regulations set forth in 10 CFR Chapter I;
 - B. The facility will operate in conformity with the application, the provisions of the Act, and the rules and regulations of the Commission;
 - C. There is reasonable assurance (i) that the activities authorized by this amendment can be conducted without endangering the health and safety of the public, and (ii) that such activities will be conducted in compliance with the Commission's regulations;
 - D. The issuance of this amendment will not be inimical to the common defense and security or to the health and safety of the public; and
 - E. The issuance of this amendment is in accordance with 10 CFR Part 51 of the Commission's regulations and all applicable requirements have been satisfied.

8612030634 861128
PDR ADOCK 05000317
P PDR

2. Accordingly, the license is amended by changes to the Technical Specifications as indicated in the attachment to this license amendment, and paragraph 2.C.(2) of Facility Operating License No. DPR-53 is hereby amended to read as follows:

(2) Technical Specifications

The Technical Specifications contained in Appendix A, as revised through Amendment No. 124, are hereby incorporated in the license. The licensee shall operate the facility in accordance with the Technical Specifications.

3. This license amendment is temporary and shall be used only once. This amendment is effective as of the date of its issuance. This amendment shall be cancelled and the Amendments No. 20, February 11, 1977 (DPR-53 License, Appendix A) and No. 114 versions of this TS shall be reinstated: 1) upon completion of preparations to drain the refueling pool below the 23 foot level but prior to commencement of the actual draining, 2) upon restoration of EDG 12 to operability or 3) at 11:59 PM on December 10, 1986, whichever occurs earlier.

FOR THE NUCLEAR REGULATORY COMMISSION



Ashok C. Thadani, Director
PWR Project Directorate #8
Division of PWR Licensing-B

Attachment:
Changes to the Technical
Specifications

Date of Issuance: November 28, 1986

ATTACHMENT TO LICENSE AMENDMENT NO. 124

FACILITY OPERATING LICENSE NO. DPR-53

DOCKET NO. 50-317

Replace the following pages of the Appendix "A" Technical Specifications with the enclosed pages. The revised pages are identified by amendment number and contain vertical lines indicating the areas of change. The corresponding overleaf pages are provided to maintain document completeness.

Insert Pages

3/4 8-5

3/4 8-7

3/4 8-8

DO NOT REMOVE THE IDENTICAL PAGES 3/4 8-5 and 3/4 8-7 ISSUED BY AMENDMENT NO. 20 (Original DPR-53 license pages) OR THE IDENTICAL PAGE 3/4 8-8 ISSUED BY AMENDMENT NO. 114. They are to be reinstated upon expiration of the temporary changes issued herewith.

ELECTRICAL POWER SYSTEMS

SHUTDOWN

LIMITING CONDITION FOR OPERATION

3.8.1.2 As a minimum, the following A.C. electrical power sources shall be OPERABLE:

- a. One 500 kV offsite circuit between the offsite transmission network and the onsite Class 1E distribution system,
- b. One 1000 kW, 480-volt, portable diesel generator, and
- c. The 69 kV SMECO offsite power circuit described in the January 14, 1977 Safety Evaluation.

APPLICABILITY: MODE 6

ACTION:

With less than the above minimum required A.C. electrical power sources OPERABLE, suspend all operations involving CORE ALTERATIONS or positive reactivity changes until the minimum required A.C. electrical power sources are restored to OPERABLE status.

SURVEILLANCE REQUIREMENTS

4.8.1.2.1 Each required independent circuit between the offsite transmission network and the onsite Class 1E distribution system shall be demonstrated OPERABLE, as follows:

- a. For the 500 kV offsite circuit, at least once per 8 hours by verifying correct breaker alignments and indicated power availability,
- b. For the 69 kV SMECO offsite power circuit, at least once per 8 hours by verifying correct breaker alignments and indicated power availability.

4.8.1.2.2 The 1000 kW, 480-volt, portable diesel generator shall be demonstrated OPERABLE at least once per 31 days by:

- a. Verifying the fuel level in the fuel tanks.
- b. Verifying the diesel starts and accelerates to synchronous speed with generator voltage and frequency at 480 ± 50.0 volts and 60 ± 3.0 Hz, respectively.
- c. Verifying the generator is loaded to ≥ 65 kW and operates for ≥ 30 minutes.

ELECTRICAL POWER SYSTEMS

3/4.8.2 ONSITE POWER DISTRIBUTION SYSTEMS

A.C. DISTRIBUTION - OPERATING

LIMITING CONDITION FOR OPERATION

3.8.2.1 The following A.C. electrical busses shall be OPERABLE and energized from sources of power other than the diesel generators with tie breakers open between redundant busses:

4160	volt Emergency Bus # 11
4160	volt Emergency Bus # 14
480	volt Emergency Bus # 11A or 14B
480	volt Emergency Bus # 14A or 11B
120	volt A.C. Vital Bus # 11
120	volt A.C. Vital Bus # 12
120	volt A.C. Vital Bus # 13
120	volt A.C. Vital Bus # 14

APPLICABILITY: MODES 1, 2, 3 and 4.

ACTION:

With less than the above complement of A.C. busses OPERABLE, restore the inoperable bus to OPERABLE status within 8 hours or be in at least HOT STANDBY within the next 6 hours and in COLD SHUTDOWN within the following 30 hours.

SURVEILLANCE REQUIREMENTS

4.8.2.1 The specified A.C. busses shall be determined OPERABLE and energized from A.C. sources other than the diesel generators with tie breakers open between redundant busses at least once per 7 days by verifying correct breaker alignment and indicated power availability.

ELECTRICAL POWER SYSTEMS

A.C. DISTRIBUTION - SHUTDOWN

LIMITING CONDITION FOR OPERATION

3.8.2.2 As a minimum, the following A.C. electrical busses shall be OPERABLE and energized from sources of power other than a diesel generator.

- 1 - 4160 volt Emergency Bus
- 1 - 480 volt Emergency Bus
- 2 - 120 volt A.C. Vital Busses

APPLICABILITY: MODE 6

ACTION:

With less than the above complement of A.C. busses OPERABLE and energized, establish CONTAINMENT INTEGRITY in accordance with Technical Specification 3.9.4 within 4 hours following a loss of all offsite power.

SURVEILLANCE REQUIREMENTS

4.8.2.2 The specified A.C. busses shall be determined OPERABLE and energized from A.C. sources other than the diesel generators at least once per 7 days by verifying correct breaker alignment and indicated power availability.

ELECTRICAL POWER SYSTEMS

D.C. DISTRIBUTION - OPERATING

LIMITING CONDITION FOR OPERATION

3.8.2.3 The following D.C. bus trains shall be energized and OPERABLE:

- a. 125-volt D.C. bus No. 11, the associated 125-volt D.C. battery bank or as necessary the Reserve Battery, and one associated full capacity charger.
- b. 125-volt D.C. bus No. 12, the associated 125-volt D.C. battery bank or as necessary the Reserve Battery, and one associated full capacity charger.
- c. 125-volt D.C. bus No. 21, the associated 125-volt D.C. battery bank or as necessary the Reserve Battery, and one associated full capacity charger.
- d. 125-volt D.C. bus No. 22, the associated 125-volt D.C. battery bank or as necessary the Reserve Battery, and one associated full capacity charger.

APPLICABILITY: MODES 1, 2, 3 and 4.

ACTION:

- a. With one 125-volt bus inoperable, restore the inoperable bus to OPERABLE status within 2 hours or be in at least HOT STANDBY within the next 6 hours and in COLD SHUTDOWN within the following 30 hours.
- b. With one 125-volt D.C. battery inoperable and the associated 125-volt D.C. bus not being supplied by the Reserve Battery except during surveillance testing per Specification 4.8.2.3.2.d.1:
 1. Restore the inoperable battery to OPERABLE status within 2 hours, or replace the inoperable battery with the OPERABLE Reserve Battery within the next 2 hours, or
 2. Be in at least HOT STANDBY within the next 6 hours and in COLD SHUTDOWN within the following 30 hours.
- c. With both 125-volt battery chargers from the same D.C. bus inoperable:
 1. Except when necessary during surveillance testing per Specification 4.8.2.3.2.d.1, restore at least one 125-volt D.C. battery charger to OPERABLE status within 2 hours or be in at least HOT STANDBY within the next 6 hours and in COLD SHUTDOWN within the following 30 hours.
 2. During surveillance testing per Specification 4.8.2.3.2.d.1, restore at least one 125-volt D.C. battery charger to OPERABLE status within 4 hours or be in at least HOT STANDBY within 6 hours and in COLD SHUTDOWN within the following 30 hours.



UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D. C. 20555

SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION

RELATED TO AMENDMENT NO. 124

TO FACILITY OPERATING LICENSE NO. DPR-53

BALTIMORE GAS AND ELECTRIC COMPANY

CALVERT CLIFFS NUCLEAR POWER PLANT UNIT NO. 1

DOCKET NO. 50-317

INTRODUCTION

The Baltimore Gas and Electric Company (BG&E, the licensee) has requested in the submittal dated November 23, 1986, an emergency, temporary change to the provisions of Technical Specification (TS) 3/4.8.1, "A.C. Sources," and TS 3/4.8.2, "Onsite Power Distribution Systems," for the Calvert Cliffs Nuclear Power Plant, Unit 1. The temporary change requested would allow the licensee to conduct Unit 1 refueling operations (core alterations and positive reactivity changes) without an operable emergency diesel generator (EDG), excluding the draining of the refueling pool below the 23 foot level. This temporary change is for mode 6 shall expire: 1) prior to commencing the actual draining the refueling pool below the 23 foot level, 2) upon restoration of EDG 12 to operability or 3) at 11:59 PM on December 10, 1986, whichever comes first.

The proposal would make the following modifications: 1) the Limiting Condition for Operation (LCO) 3.8.1.2.b requirement that one EDG be operable will be replaced by LCOs 3.8.1.2.b and 3.8.1.2.c which require an operable 1000 kW, 480 VAC portable diesel generator (PDG) and an operable 69 kV offsite power circuit; 2) Surveillance Requirement 4.8.1.2 will be changed to verify the correct breaker alignments and indicated power availability of the 500 kV and 69 kV offsite power circuits at least once per eight hours and the operability of the PDG at least once per 31 days; and 3) the LCO 3.8.2.2 requirement to have an operable EDG will be deleted and the associated action statement will be modified to require establishing refueling containment integrity in accordance with LCO 3.9.1 within four hours following a complete loss of all offsite A.C. power (LOSP).

Additionally, minor clarifying changes were made with BG&E staff concurrence to TS 3/4.8.1. The LCO 3.8.1.2.a was modified to specify "one 500 kV offsite circuit" rather than the previous "one circuit" to distinguish this circuit from the 69 kV offsite circuit. The Surveillance Requirement 4.8.1.2 was deleted as it was entirely redundant with Surveillance Requirements 4.8.1.2.1 and 4.8.1.2.2. Additionally, LCOs 3.8.1.2 and 3.8.2.2 were made applicable only to mode 6, as requested in the licensee's amendment request

8612030644 861128
PDR ADDCK 05000317
P PDR

BACKGROUND

The licensee had observed an excessive combustion gas buildup in the jacket cooling water system of 12 EDG. An attempt to troubleshoot and repair the 12 EDG was made by BG&E during a 20 day period in September 1986, but BG&E was unsuccessful in being unable to correct this deficiency. The 12 EDG is currently undergoing overhaul to repair this previously identified problem. In order to permit continued Unit 2 power operations, it was necessary for the licensee to rededicate the 11 EDG from Unit 1 to Unit 2. As a result, Unit 1 does not have an operable EDG.

STAFF CONCERNS

The onsite A.C. power system at Calvert Cliffs consists of three identical EDG's. Normally, 11 EDG is dedicated to Unit 1, while 21 EDG is dedicated to Unit 2. The 12 EDG is a "swing diesel generator"; i.e., it can be aligned to substitute for 11 or 21 EDGs. The 11 EDG was realigned to be dedicated to Unit 2 in order to support continued mode 1 operation as 12 EDG was out of service due to undergoing overhaul. This was acceptable as Unit 1 was entirely defueled and was not required to have an operable EDG.

The principal issues involved in this amendment relate to the potential for an LOSP concurrent with the single failure of the 11 or 21 EDG during core alterations, the movement of irradiated fuel, or with fuel in the vessel. This LOSP event would result in an A.C. blackout for Unit 1 with only one EDG operable onsite and aligned to Unit 2. The immediate concerns would be 1) decay heat removal, 2) establishment of containment integrity, 3) boron stratification, and 4) fuel handling incidents.

The licensee has addressed the above concerns and provided data on plant design features and/or special considerations that the licensee provided to mitigate the consequences of the above event. These design features and special considerations are discussed in further detail in subsequent sections of this report.

MITIGATING FEATURES

Offsite Power

There are two, independent, 500 kV offsite power circuits coming into the Calvert Cliffs site. These offsite power circuits connect to the BG&E grid and supply power to the plant during normal operation as well as during shutdown and startup. During the shutdown and refueling modes of operation, the unit is normally required to have one circuit operable between the offsite transmission network and the onsite Class 1E distribution system and one operable EDG. The offsite circuit may be either one of the two, independent, 500 kV offsite power circuits or the 69 kV feeder circuit coming from the Southern Maryland Electric Cooperative (SMECO). The SMECO feeder is not connected directly to the BG&E grid. SMECO obtains power from the Potomac Electric Power Company (PEPCO), which in turn, is connected to a larger, East Coast grid that includes BG&E.

With this arrangement, the SMECO feeder is essentially isolated from the BG&E distribution system. This ensures that disturbances on the BG&E system will have little, if any, impact on the 69 kV SMECO feeder. During the period when Unit 1 is in mode 6 (refueling mode) without an operable EDG, the 69 kV feeder line, and a 500 kV offsite circuit will be required to be operable. The 69 kV feeder line will be used to energize the 13 kV bus 23. Bus 23, in turn, can be aligned to power all plant safety buses through manual action in the control room. The SMECO feeder is sized to carry safe shutdown loads in both units simultaneously.

Calvert Cliffs has never had a complete loss of offsite power, which indicates the good stability of the BG&E grid. The 500 kV offsite power lines and towers are designed to withstand winds of 100 and 160 mph, respectively. Winds of this velocity would generally be from a hurricane or a tornado. The probability of tornadoes or hurricanes being spawned and striking the Calvert Cliffs site is extremely low during the late November to early December time frame. Regardless of the low incidence of these storms, the offsite power network could withstand a localized storm with winds in excess of 100 mph. This is because the BG&E transmission line and the SMECO feeder occupy different rights of way and it is extremely unlikely that a single, localized storm would strike both. At the site, the 500 kV offsite power circuits are overhead while the 69 kV feeder circuit is underground. A storm onsite may damage the 500 kV lines, but would not affect the SMECO feeder.

To compensate for the lack of any operable EDG for Unit 1 during mode 6 refueling operations, the licensee is requesting an LCO requiring that the 69 kV SMECO line and a 500 kV offsite power circuit be operable while no EDG is operable. This provides added reliability over the one operable offsite power circuit normally required for mode 6 operation.

The operability of the 500 kV offsite power circuit and of the 69 kV SMECO feeder is to be demonstrated at least every eight hours. If either is found to be inoperable, all operations involving core alterations or positive reactivity changes shall be suspended until both offsite power circuits (500 kV and 69 kV) are restored to operability. If either becomes inoperable while fuel is on the refueling machine and not fully inserted into the core, that fuel must be held stationary in place.

125 VDC Power

The DC electrical power system (including batteries, battery chargers, and inverters) consist of four separate, independent and isolated channels, each of which feeds both units. In the event of an LOSP, the DC system battery chargers could be powered from the Unit 2 AC power (either offsite or EDG) or from the 1000 kW, 480 VAC PDG generator to supply the Unit 1 DC instruments, control circuits and the 120 VAC vital busses through the inverters.

If no A.C. power sources were available to power the battery chargers, the 125 VDC power system would provide enough power and generating capacity to run the necessary loads to set and maintain containment integrity, provide adequate lighting and ventilation, and supply all necessary controls and instrumentation for four hours.

Portable Diesel Generator

The licensee has obtained a 1000 kW PDG and located it onsite. The PDG operates at 480 VAC and 60 HZ. In the event of a Unit 1 A.C. blackout, the PDG can be connected to the 14A bus to power the 11 fuel pool cooling pump (FPCP) and a battery charger. Procedures to connect the PDG to the 14A bus have been developed, approved, and tested. Additionally, all staff personnel who may need to conduct this procedure have been trained in the use of these procedures through their actual performance.

The licensee has agreed that the operability of the PDG shall be demonstrated prior to initially moving fuel without an operable EDG. If the PDG is found to be inoperable, all operations involving core alterations or positive reactivity changes shall be suspended until the PDG is restored to operability.

These operability requirements are consistent with the current refueling mode operability requirements for the EDG. In addition, the PDG has demonstrated a high reliability in that it was successfully demonstrated to be operable every 72 hours during the 10-day period in September 1986 when Units 1 and 2 were operating at power with 12 EDG out of service due to troubleshooting the carbon monoxide inleakage in the 12 EDG's associated jacket cooling water system.

Decay Heat Removal

The shutdown cooling system functions to maintain the proper reactor coolant system (RCS) temperature during refueling. Normally in this system, reactor coolant is circulated using the low-pressure safety injection (LPSI) pumps. A suction is taken on the RCS loop No. 2 reactor vessel hot leg by the LPSI pumps. It is then discharged into a common header that flows into the two heat exchangers or their bypass prior to reentering the reactor vessel through the four safety injection nozzles. Cooling is provided to the heat exchangers by the component cooling water system. The LPSI pumps are 4.16 kVAC powered. During this period of refueling Unit 1 without an operable EDG, no emergency power supply is available to these LPSI pumps. Thus, in the event of an LOSP, shutdown cooling flow will be lost.

Additionally decay heat removal capability for the Unit 1 RCS can be provided by the No. 11 loop of the spent fuel pool cooling system. This loop can be lined up to take a suction off the Unit 1 refueling pool, the Unit 1 spent fuel pool or the No. 11 refueling water tank through using the No. 11 fuel pool cooling pump (FPCP). This loop then cools the circulating water by passing it through the 11 spent fuel pool cooler prior to returning the water to either the refueling pool or the spent fuel pool. Unit 1 service water provides the cooling water supply to the 11 spent fuel pool cooler. In the event of an LOSP, the PDG can power the 11 FPCP and the Unit 2 service water system, powered by either 11 or 21 EDG, can provide a slightly reduced flow of cooling water to the 11 spent fuel pool cooler. This flow is reduced because the crossover supply and return lines between the Unit 1 and the Unit 2 service water systems consist of 10-inch piping whereas the normal service water supply to the fuel pool cooler is provided through 12-inch piping.

The spent fuel pool cooling system is designed such that when the pool contains 1537 fuel bundles (22/3 cores), the pool temperature will maintain at a maximum of 155°F. The fuel is assumed to have undergone steady state burnup at 2700 mWt for 1060 days through Unit 1 Cycle 4 (Unit 2 Cycle 3) and 1620 days thereafter, 7 days of decay. Under these conditions, the maximum heat rate is 17.3×10^6 BTU/HR while the design capacity of the coolers is to remove 20.2×10^6 BTU/HR (or 10.1×10^6 BTU/HR/cooler) while maintaining the pool at 127°F.

Currently, the spent fuel pool contains 1215 fuel bundles (slightly less than 17/3 cores). Of these fuel bundles, 217 have decayed a minimum of 35 days. All of the other 998 fuel bundles have decayed at least one full year. The heat rate that could be associated with 1215 fuel bundles that had undergone steady state burnup at 2700 mWt for 1060 days (for the 12-month cycles) or 1620 days (for the 18-month cycles) and then had decayed for only 7 days would be 13.7×10^6 BTU/HR. This is well within the normal capacity of the spent fuel pool cooling system. Even in the event of an LOSP concurrent with the failure of 11 EDG, both FPCPs would be powered, 11 FPCP from the PDG and 12 FPCP from 21 EDG, providing more than sufficient heat removal capability. In only the instance that an LOSP occurred concurrently with a failure of the 21 EDG would the spent fuel pool cooling system heat removal capability be less than the heat rate of 1215 fuel bundles with only 7 days of decay.

Finally, the large water volumes of the spent fuel pool and the refueling pool act as large heat sinks for the decay heat. The licensee calculated that it would take more than 10 hours with a refueling pool level of 23 feet or greater without any spent fuel pool cooling or shutdown cooling to raise the spent fuel pool and refueling pool temperature from 100°F to 140°F following an LOSP. Additionally, the licensee has determined that the spent fuel pool temperature limit of 155°F would not be reached following an LOSP from more than 13 hours. These calculations were based upon 1215 fuel bundles in the pools with 30 days

of decay for 217 fuel bundles that were present in the Unit 1 Cycle 8 core. The licensee has committed to maintaining the refueling pool temperature below 100°F while 12 EDG is inoperable to provide an adequate temperature margin below 140°F for decay heat removal in the event of a loss of shutdown cooling. This temporary change to the TS shall expire before the licensee is permitted to drain the refueling pool below the 23 foot level. This shall ensure that an adequate volume of water will be maintained in the refueling pool to act as a heat sink for decay heat removal in the event of a complete loss of shutdown cooling and spent fuel pool cooling.

Containment Integrity

Containment integrity is normally required in the refueling mode 1) during irradiated fuel movements or core alterations to ensure that the site exclusion boundary doses that could result from a fuel handling incident are within the guidelines of 10 CFR 100 and 2) in the event of a loss of shutdown cooling or if the normal or emergency power supplies to the A.C. electrical busses listed in TS LCO 3.8.2.2 are inoperable, to limit the site exclusion boundary doses that could result from an RCS heat up and high airborne contamination due to the loss of decay heat removal capability.

To permit the performance of maintenance operations and the movement of equipment into or out of the Unit 1 containment structure while in mode 6 when fuel movement or core alternations are not in progress, this temporary change will permit the licensee to refrain from establishing containment integrity as normally required due to the lack of an operable EDG during this period. In the event of a Unit 1 A.C. blackout, the licensee will be required to establish refueling containment integrity within four hours rather than the eight hours currently required for a loss of either the normal or emergency A.C. power supplies.

Additionally, the licensee is providing physical means for closing within four hours following a Unit 1 A.C. blackout, any containment penetrations whose closure would be prevented by the A.C. blackout. The only penetration unable to close due to this A.C. blackout is the equipment hatch. The licensee has committed to maintaining the equipment hatch in the vertical position rather than resting the equipment hatch horizontally on the structural steel supports. This will permit the equipment hatch to be closed through using hydraulic jacks to establish containment integrity within four hours following a Unit 1 A.C. blackout.

The licensee shall continue to be required to establish containment integrity within four hours following a loss of shutdown cooling.

To ensure the maintenance of containment integrity through the steam generators (SGs) and the main steam system, the licensee has committed to maintaining the main steam isolation valve (MSIV) for the 11 SG closed while any of the SG tubes are pulled. The licensee has stated that no SG tubes will be pulled from the 12 SG.

Boron Stratification

While the unit is in mode 6 with the reactor vessel head unbolted or removed, the boron concentration of all filled portions of the RCS and refueling pool are required to be maintained uniform for reactivity control in the water volumes having direct access to the reactor vessel. Normally, the operation of the shutdown cooling system will provide adequate flow to maintain a uniform boron concentration.

The licensee has determined that at the temperatures normally maintained in the RCS during mode 6 (80°F to 140°F) sufficient convection flow exists in the refueling pool due to the decay heat of the core to maintain the boron in solution with a uniform concentration throughout the refueling pool. This is true even with a full core in the reactor vessel which would provide the maximum flow resistance.

Fuel Handling Incident

The likelihood or severity of a fuel handling incident are not increased by permitting the movement of irradiated fuel or core alterations without an operable EDG.

The severity of the site exclusion boundary dose due to the fuel handling incident is dependent upon containment integrity. It would be unchanged as containment integrity must be set prior to commencing fuel movement or core alterations. The only penetrations that are permitted to be open during these operations are the containment purge supply and exhaust isolation valves. These valves close using 120 VAC power which is supplied through the inverters from the 125 VDC system and hence, are not impacted by an LOSP.

The probability of a fuel handling incident would not be increased due to the movement of irradiated fuel or core alterations without an operable EDG because a fuel assembly is mechanically grappled by the fuel handling machine and mechanically interlocked to be held except when the fuel handling machine is in the fully inserted position.

STAFF EVALUATION AND CONCLUSIONS

The licensee's requested TS change involves allowing the movement of irradiated fuel or core alternations in Unit 1 without the services of an operable EDG. To fully evaluate the potential effects of the proposed action, the staff postulated an event which, itself, is beyond those normally, specifically considered in the design basis for the plant; however, it is appropriate in this case because of the lack of an operable EDG for Unit 1 and the extended inoperability status of the 12 EDG. This event is a complete LOSP concurrent with the failure of either the 11 or 21 EDG. The staff then reviewed and evaluated the plant design features, additional equipment, and/or plant personnel actions the licensee would utilize to mitigate the consequences of the postulated event. The preceding sections of this evaluation contain descriptions of the plant design features and/or personnel actions the licensee would utilize. These features and actions, combined, are adequate to mitigate the consequences of the postulated event.

The LOSP event with the most severe results would be the LOSP with the concurrent failure of 21 EDG and with 217 fuel assemblies reloaded into the Unit 1 reactor vessel. This event would result in a loss of all Unit 1 shutdown cooling and the loss of both 11 and 12 FPCPs. The PDG would be connected to the 14A bus to power the battery charger for Unit 1 and the 11 FPCP. The 11 EDG would provide all emergency A.C. power loads to Unit 2 including powering the Unit 2 service water system. This service water system can be cross-connected to Unit 1 to simultaneously provide the Unit 2 service water loads as well as providing a reduced service water flow to the 11 spent fuel pool cooler. A conservative assessment of the heat removal capability provided by the 11 spent fuel pool cooling loop when cooling water is being supplied by the Unit 2 service water system indicates that this configuration provides insufficient cooling to remove all of the decay heat generated by 1215 fuel bundles. However, this configuration would remove approximately $\frac{1}{2}$ of the decay heat generated by the 1215 fuel bundles, thus significantly increasing the time required to heat up the RCS from 100°F to 140°F. This heat up time was estimated by the licensee to be on the order of greater than 10 hours when there is no shutdown cooling or spent fuel pool cooling available.

Commission studies state that restoration of offsite power to nuclear plants generally occurs within four hours for the LOSP events. The licensee has committed to maintaining the RCS temperature below 100°F while the 12 EDG is out of service. This provides added assurance that the mode 6 upper temperature limit of 140°F will not be exceeded due to a loss of decay heat removal resulting from an LOSP. Based on all of the above, power would be restored to the shutdown cooling pumps and fuel pool cooling pumps long before the RCS would exceed 140°F. The above scenario is unlikely because it would require, simultaneously, (1) complete loss of three offsite power sources; (2) the inability to restore in well over 20 hours any of the three offsite power sources, one of which is powered from a different grid and has a different right-of-way; (3) the loss of the 21 EDG for more than 20 hours.

Based on its evaluation, the staff concludes that an emergency TS change to permit Unit 1 refueling operations without an operable EDG up to but not including the draining of the refueling pool below 23 feet or until 11:59 PM December 10, 1986, is acceptable.

FINAL NO SIGNIFICANT HAZARDS CONSIDERATION DETERMINATION

The Commission's regulation 10 CFR 50.92 states that the Commission may make a final determination that a license amendment involves no significant hazards consideration if operation of the facility in accordance with the amendment would not:

- (1) Involve a significant increase in the probability or consequences of an accident previously evaluated; or
- (2) create the possibility of a new or different kind of accident from any accident previously evaluated; or
- (3) involve a significant reduction in a margin of safety.

The only accident considerations affected by the amendment are those relating to the potential for a Unit 1 A.C. blackout while moving fuel, during core alterations or with fuel in the reactor vessel. The A.C. blackout is protected against by compliance with the provisions of 10 CFR 50, Appendix A, Criterion 17 (GDC 17), "Electrical power systems," and by the TS restrictions for mode 6 operation with operable normal and emergency A.C. power supplies. Compliance with GDC 17 ensures that the licensee has sufficient redundancy of electrical systems, both offsite and onsite, to ensure that the core is cooled and containment integrity and other vital functions are maintained in the event of postulated accidents. Normally in mode 6, the licensee must only have one operable EDG and one operable offsite power circuit to perform core alterations or fuel movements. In the event that one of these two power supplies was to become inoperable, the licensee must suspend core alterations and fuel movements and establish containment integrity within eight hours. This is to ensure that adequate decay heat removal capabilities are retained and that in the event that the decay heat removal capability is lost or is insufficient for the heat generated by the fuel bundles in the core, that containment integrity is established well before reaching an RCS temperature of 200°F to prevent the possibility of any high airborne contamination radiological releases. The only affect of this amendment is to replace the normally required emergency A.C. power supply of the EDG with the 69 KV SMECO feeder, offsite, and the onsite PDG.

Operation of the facility in accordance with the proposed amendment would allow the licensee to move fuel and conduct core alterations without an operable EDG. To assure that the proposed amendment would not result in a significant increase in the probability or severity of the Unit 1 A.C. blackout scenario, additional requirements are provided to have two operable offsite A.C. power circuits operable rather than the one offsite A.C. power circuit normally required. The probability of the Unit 1 A.C. blackout scenario is reduced by the source and design of the second operable offsite A.C. circuit. This circuit is provided power from a grid different from that which supplies the circuits normally utilized. Additionally, the right-of-way of this circuit comes underground from the west while the other circuit comes from the north. A 1000 kW PDG has been located on site. The PDG has the capability to provide within one hour A.C. power, concurrently, to a fuel pool cooling pump and a battery charger for a Unit 1 A.C. blackout. The probability and severity of a fuel handling incident resulting from the Unit 1 A.C. blackout would be unchanged by this amendment. The probability of a fuel bundle drop due to an LOSP is unchanged as the refueling machine grapple that holds the fuel bundle is mechanically interlocked to physically prevent the fuel bundle from being lowered or dropped during the fuel movement when A.C. power is lost.

The site exclusion boundary doses would be the same as for a fuel handling incident when an EDG is operable because refueling containment integrity must be established prior to and during all fuel movements or core alterations. The lack of an operable EDG would have no effect upon the quality of the containment integrity already established.

Due to these factors, the Commission has determined that operation of the facility in accordance with the proposed amendment would not involve a significant increase in the probability or consequences of the unit A.C. blackout or of any accident previously evaluated.

The accident of concern for this proposed amendment as discussed above is the Unit 1 A.C. blackout which was previously considered. The proposed amendment would not create the possibility of a new or different kind of accident from any previously evaluated.

Finally, this proposed amendment does not involve a significant reduction in any margin of safety.

Based upon the consideration provided above, the staff concludes that the proposed amendment meets the three criteria of 10 CFR 50.92 and, as such, involves no significant hazards considerations.

STATEMENT OF EMERGENCY CIRCUMSTANCES

Two EDGs (11 and 12) were scheduled for overhaul during the current refueling outage which started on October 24, 1986. Due to the requirements of TS 3/4.8.1 that Unit 2 must have two operable EDGs for continued power operation and the Unit 1 requirement of TS LCO 3.8.1.2.b that no operations involving core alterations or positive reactivity changes are permitted without an operable EDG, it was necessary for the licensee to overhaul 11 EDG first and maintain 12 EDG operable while refueling the core.

Initially, the licensee had expected to complete the overhaul of 11 and 12 EDGs before commencing the Unit 1 fuel reload operations. During the overhaul of 11 EDG, the licensee encountered numerous repair problems that resulted in the 11 EDG overhaul taking substantially longer to complete than was anticipated. Based on the slippage in the EDG overhaul schedule, the 12 EDG may not be completed until December 6, 1986. Refueling operations are expected to be ready to commence on November 29, 1986. The lack of an operable EDG for Unit 1 could prevent the refueling of Unit 1 for up to seven days and unnecessarily delay unit startup by a similar period of time.

The staff concludes that an unavoidable emergency situation does exist that would unnecessarily delay startup of Unit 1 and as such, warrants the emergency amendment procedures provided by 10 CFR 50.91.

STATE CONSULTATIONS

The appropriate officials of the State of Maryland were consulted concerning this amendment request. They had no comments.

ENVIRONMENTAL CONSIDERATION

This amendment involves a change in the installation or use of a facility component located within the restricted area as defined in 10 CFR Part 20. The staff has determined that the amendment involves no significant increase in the amounts, and no significant change in the types, of any effluents that may be released offsite, and that there is no significant increase in individual or cumulative occupational radiation exposure. The Commission has made a final no significant hazards consideration finding with respect to this amendment. Accordingly, the amendment meets the eligibility criteria for categorical exclusion set forth in 10 CFR §51.22(c)(9). Pursuant to 10 CFR §51.22(b), no environmental impact statement or environmental assessment need be prepared in connection with the issuance of the amendment.

CONCLUSION

We have concluded, based on the considerations discussed above, that (1) this emergency situation could not be avoided, (2) the licensee acted in a timely manner with respect to responding to this emergency, (3) because the amendment does not involve a significant increase in the probability or consequences of an accident previously evaluated, does not create the possibility of an accident of a type different from any evaluated previously, and does not involve a significant reduction in margin of safety, the amendment does not involve a significant hazards consideration, (4) there is reasonable assurance that the health and safety of the public will not be endangered by operation in the proposed manner, and (5) such activities will be conducted in compliance with the Commission's regulations, and the issuance of the amendment will not be inimical to the common defense and security or to the health and safety of the public.

Date: November 28, 1986

Principal Contributor: Scott A. McNeil